Original Article

Urinary Tract Stone

Risk Factors in the Upper Urinary Tract Stone Disease in Peshawar and Charsadda

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ABSTRACT

Objective: The present study was design to know the biochemical Risk Factors of the upper urinary Tract Stone Disease in the Peoples of Peshawar and Charsadda District.

Study Design: Observational Study

Place and Duration of Study: This study was carried out at District Head Quarter Teaching Hospital Charsadda & Naseerullah Khan Babar Memorial Teaching Hospital Kohat Road Peshawar from 12th August 2012 to 11th August 2013.

Materials and Methods: One hundred subjects who were suffering from upper urinary tract stone disease were included in the study. The evidence of stone in the renal and history of spontaneous passage of stones in the urine were determined regarding Microscopic Examination.

Results: The age range of our subject was between 01 - 60 years. The mean age ± S.D of age of stone former for men was 34.6 ± 8.6 years and for female 30.8 ± 6.7 in N.S.F. Family history of stone disease was found in (16%) of patients. 4% in maternal side and 12% paternal.

Conclusion: The Serum Phosphate level was higher in S.F than N.S.F and is a risk factor for Upper Urinary Tract Stone Disease in Peshawar and Charsadda.

Key Words: Urolithiasis, Upper Urinary Tract, Stone disease, Hypercalcemia,

INTRODUCTION

Pakistan is situated in "stone belt" extending from Turkey, Israel, Iran, India, Thailand and Indonesia, having high incidence of urinary calculi. Calculus disease is endemic in Pakistan[1,2] perhaps the stone disease incidence in Pakistan is highest in the world [3, 4]. In Pakistan no effort has been made so far to localize the geographical high and low stone forming areas no detail studies are available on the clinical and etiological aspect of the disease[5]. The incidence of bladder stone in adult is dependent upon the changing demographic pattern of Pakistan. More people are surviving into the prostatic age and secondary stone have shown a rise[6]. Peshawar and Charsadda are lying in high stone incidence belt, but so far no study evaluating etiology and risk factors of stone disease in these areas have been done. Large number of patients suffering from urinary stone remain asymptomatic and they are diagnosed while investigation for some other problem. However those with symptomatic urolithiasis usually present with an acute episode of colic at lumber region on affected side. Episode typically occurs at late evening or early morning. Pain is abrupt in onset while patient is usually at rest. Sever pain is felt at flanks which radiate round the abdomen and towards the testicles in male and labia major in female. Nausea and vomiting, I usually associated with renal colic. Pain is of stabbing nature i.e. the patient narrate it as someone has stabbed in the flank [7]. Renal stone creates trouble some pain when it is trapped or impacted somewhere in urinary tract. This impaction of stone leads to partial or total obstruction of that segment of urinary tract. The obstructed segment is dilated and as these tubules are sensitive to stretch, pain stimuli are initiated. It is also suggested that prostaglandins are involved in the genesis of renal and ureteric colic. Therefore the present study was design to know the biochemical Risk Factors of the upper urinary Tract Stone Disease in the Peoples of Peshawar and Charsadda District. In order to have correct diagnosis of renal stone diseases, Urine analysis, Radiographic examination, Intravenous Urogram (I.V.U), Abdominal ultrasound, Renal angiography, Radio-isotope method investigations and diagnostics procedures are carried out.

MATERIALS AND METHODS

Subjects were selected from District Head Quarter Teaching Hospital Charsadda & Naseerullah Khan Babar Memorial Teaching Hospital Kohat Road Peshawar (Urology and General Surgical Units). One hundred subjects who were suffering from upper urinary tract stone disease were included in the study. The detailed clinical history and physical examination were made to exclude any disease which might affect our results. The diagnosis of urinary stone in upper tract will be based on X-ray evidence of stone in the renal or ureteric area and History of spontaneous passage of stone in the urine, criteria. Microscopic examination of the urine was carried out and those patients with pyuria i.e. white blood cells more than eight per high power field, were not included in the study. A Proforma giving details of patients history and family history of stone disease in immediate family (parents and off springs)

were filled. Blood was collected from the subjects during morning time between 9:00 – 11:00 AM 10 ml blood sample was collected from each subject in a disposable syringe without applying tourniquet and immediately put in the centrifuge tubes were left undisturbed till a firm clot settled down. Twenty four hours urinary sample was collected from each individual in three liter capacity plastic jars, previously washed with hydrochloric acid and then distilled water and finally three times with deionised water. The jars were dried by inverting them. To dried jars toluene (5ml) was added as preservative. After collection of urine, its pH was recorded immediately by using pH strips. Then 20ml of urine was sucked out with a glass pipette and delivered to two 10 ml screw capped. The remaining urine volume was measured in graduated cylinder already washed with deionised water, by subtracting the amount (5ml toluene) and adding 20 ml more to the noted volume for collected urine. Water samples were collected from the drinking source from which both patients and controls use to drink for most of the time. Collector was asked to make sure that one liter plastic jar previously washed and cleaned are utilized and filled without contamination. About one hundred sample from drinking source of respective areas of patients and control were collected and sent to Government Public Health Food Analysis Laboratory Peshawar for chemical analysis for human consumption.

The following serum estimations, urinary estimations and were performed on the collected sample, and analysis was carried out on the water sample

Serum Estimations	Urinary Estimations	Analysis	
- Calcium - Uric acid - Inorganic phosphate - Total protein - Sodium - Potassium - Creatinine	- Volume - pH - calcium - Uric acid - Inorganic Phosphate - Total proteins - Sodium - Potassium - Oxalate - Creatinine	- Colors - Odor - pH - Conductivity - Total solids - Total Dissolved solids - Suspended solids - Total Hardness (as Calcium carbonate) - Magnesium hardness - Calcium as calcium +1 - Magnesium as Mg + 2	- Chloride - P-alkalinity - Sulphate - Nitric and Nitrate - Iron - Phosphate - Silica

Quantitative serum and urinary estimations were made for calcium, uric acid, organic phosphate, sodium, potassium, total protein, oxalate and Creatinine. All the pipette and test tubes were washed with deionised water and dried before use.

RESULTS

At Peshawar and Charsadda risk factors in the upper urinary tract stone disease were studied and we have come up with following results. The age range of our subject was between 01-60 years. The mean age ± S.D of age of stone former for men was 34.6 ± 8.6 years and for female 30.8 ± 6.7 in N.S.F. the age and sex distribution of total 100 cases is given (Table No. 1). The highest incidence of stone disease was in the age group of 16-30 years.

Table No. 1: Total number of patients included in study from both Peshawar and Charsadda 100.

Number of Patients & Location:		
Number of patients from Peshawar	60	
Number of patients from Charsadda	40	
Total number of male patients from both cities	64	
Total number of female patients form both cities	36	
Sex Distribution	Peshawar	Charsadda
Male	40 (40%)	24 (24%)
Female	20 (20%)	16 (16%)
Age Group & Patients in %age	Male	Female
01-15 years	8%	4%
16-30 years	20%	20%
31-45 years	28%	8%
46-60 years	8%	4%

The mean ± S.D of urine volume of 100 Stone Formers (S.F) & Non-stone formers (N.S.F) was 1401 ± 269.6 ml and 1051.7 ± 54 ml respectively. The mean urine volume of S.F was greater than that of N.S.F and statistically it is significant ($P < 0.05$). (Table-2) Mean ± S.D urine volume in stone formers (S.F) and non-stone formers (N.S.F) at Peshawar and Charsadda (n=100).

Table No.2:

Urine Volume (ml)		Significance
S.F	N.S.F	
1401.6 ± 269.6	1051.7 ± 54	The difference is significant ($P < 0.05$)

DISCUSSION

The presents study was conducted to determine the biochemical risk factors urolithiasis in Peshawar and Charsadda. For this purpose Serum & 24 hour's urinary samples were collected from one hundred stone formers and one hundred controls. One hundred samples of drinking water from Peshawar and Charsadda were collected and analyzed to determine the biochemical risk factor involved in urolithiasis due to drinking water. Our study showed positive family history 16 % (maternal 4% and paternal 12%). These studies are interesting because of showing in larger variation. This may be due to the polygenic inheritance for stone

diseases and the gene having originally partial penetrance are attaining near complex penetrance. Similarly, family members with the same food habits have higher incidence compared to others. Urine was analyzed for calcium, uric acid, inorganic phosphates, sodium, potassium total proteins and Creatinine. Besides these, urinary oxalate was also estimated. Urine volume and pH was noted in both stone formers (S.F) and non-stone formers (N.S.F). Low urinary volume has been blamed as one of the risk factors of Urinary stone disease. The present study has also shown negative or positive association between water hardness and urinary stone disease is debatable. Low urine volume has been attributed as a risk factor in the upper urinary tract stone [8, 12, 13.] Urolithiasis has a worldwide distribution ranging from upper urinary tract stone diseases to the lower urinary tract stone diseases. Bladder stone was a common disease about a hundred years ago, but nowadays upper urinary tract stone diseases are common [8, 9.] Upper urinary tract stone diseases have a high incidence in western countries. This high incidence could be due to affluence, rich diet and more sedatory life particularly in the middle age [10.] Bladder stone diseases in children have been extensively studied and it has been shown that in the past few years the incidence has shown a decline. This may be due to the improved socio-economic conditions and living standard and better health facilities for the children including O.R.S supply to the dehydrated children by W.H.O and other U.N organizations like UNICEF. The living conditions in Pakistan improved because of the Pakistanis working in the Middle East[5, 14, 15.] Robertson et al, 1976 reported a high incidence of stone disease with high protein diet intake. This may be a factor of increase incidence of stone diseases in Peshawar and Charsadda because of traditional Tikka Karahi, Chappli Kabab, Roasted meat and Pitta Tikka (hidden barbeque meat). Secondary calculi in the prostatic age group are increasing because of the increased life expectancy in Pakistan [6]. Urinary stones in children are usually genetic and most commonly due to hypercalciuria. Isolated hematuria in children may be caused by hypercalciuria and precede calculus formation [11].

CONCLUSION

Our study on the subject of risk factors in the upper urinary tract stone diseases in Peshawar and Charsadda therefore, it is concluded that:

1. 40% of the patients (male & female) develop upper urinary tract stone diseases between 16-30 years of age. The mean age of stone for men was 34.6 years.
2. Family history of stone diseases is found in 16% of stone formers.
3. The urinary volume/day in S.F. as advised by their physicians, because all cases were known cases or urolithiasis.
4. The urine excretion of sodium/day in both S.F as well as N.S.F was above the normal range of urinary sodium (200 mg/day). The excretion in S.F was greater than N.S.F and statistically significant and it might be a contribution risk factor of urolithiasis.
5. The urinary pH both in N.S.F and S.F were within normal physiological range, therefore the urinary pH cannot be blamed as a risk factor for urolithiasis.
6. Drinking water cannot be blamed as risk factor for urolithiasis in Peshawar and Charsadda, because using same Source of drinking water some people develop urinary stone disease and some other is spared.

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